



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/888,912	06/25/2001	Sang-Jun Choi	8021-58 (SS-15253-US)	9760

7590 03/26/2003

Frank Chau
F. CHAU & ASSOCIATES, LLP
Suite 501
1900 Hempstead Turnpike
East Meadow, NY 11554

EXAMINER

THORNTON, YVETTE C

ART UNIT	PAPER NUMBER
----------	--------------

1752

DATE MAILED: 03/26/2003

3

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/888,912

Applicant(s)

CHOI ET AL.

Examiner

Yvette C. Thornton

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9 and 13-24 is/are rejected.
- 7) ☒ Claim(s) 8 and 10-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>3</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This is written in reference to application number 09/888912 filed on June 25, 2001 and published as US 2002/0076641 A1 on June 20, 2002.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

2. Claims 21 and 22 are objected to because of the following informalities: Claims 21 and 22 depend on claim 12. Claims 21 and 22 refer to a photoresist composition whereas claim 12 refers to a photosensitive polymer. The examiner believes that claims 21 and 22 were meant to depend from claim 13. Appropriate correction is required.

3. For examination purposes, the examiner has evaluated claims 21 and 22 as depending on the subject matter of claim 13.

Claim Interpretations

4. Claims 4 and 15 state that "y" is greater than or equal to 2. The examiner has interpreted this to mean that y is 2 or 3 because the independent claim has established that y is an integer from 1 to 3.

5. The examiner notes that claims 7-9, 22 and 24 fail to define the monomeric content of the hydroxystyrene monomer represented by "n" and "m" in the said claims. The examiner has failed to find a clear definition of "n" and "m" as related to the said hydroxystyrene monomer in the present specification. However, the claimed ratio of $m/(m+n)$ in claim 7 cannot be within the range of 0.05-0.40 when $n=0$. Likewise,

Art Unit: 1752

$l/(l+m+n)$ and $n/(l+m+n)$ cannot be within the claimed range of claims 8 and 9 when m is 0. Therefore, the examiner has interpreted the claim to require $n/(m+n)$ to be in the range of 0.60-0.95 in claim 7 and $m/(l+m+n)$ to be in the range of 0.30-0.85 in instant claims 8 and 9 based on a 100% total. The same interpretation applies to the corresponding formulae presented in instant claim 22. Clarification of the hydroxystyrene content is requested.

6. Furthermore, the examiner notes that while all the monomer units of instant claims 10-12 are clearly defined, they are not based on a total content of 100%. The MPEP 2173.05(c) discloses that,

“[o]n the other hand, the court held that a composition claimed to have a theoretical content greater than 100% (i.e., 20-80% of A, 20-80% of B, and 1-25% of C) was not indefinite simply because the claims may be read in theory to include compositions that are impossible in fact to formulate. It was observed that subject matter, which cannot exist in fact, can neither anticipate nor infringe a claim. [In re Kroekel, 504 F.2d 1143, 183 USPQ 610 (CCPA 1974)].”

The examiner has interpreted the claims 10-12 to require the presence of all three monomers.

The same interpretation applies to corresponding formulae presented in instant claim 22.

7. The examiner has based the following rejections on the above interpretations.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in

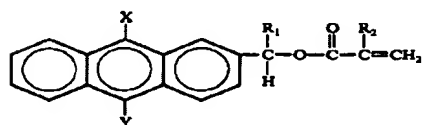
Art Unit: 1752

section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

9. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

10. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Stolka et al. (US 4117239 A). Stolka teaches a process for the preparation of 2-anthryl and substituted 2-anthryl functional monomers and polymers. Example XV exemplifies the preparation of poly(1-(2-anthryl)-ethyl methacrylate). The said polymer has the structure:



wherein X and Y are hydrogen and R1 and R2 are CH3 (c.

3, l. 5-51 and c. 13, l. 30-c. 14, l. 62). It is the examiner's position that the use of anthracene meets the claim limitation of $y=2$.

11. Claims 1-6 are rejected under 35 U.S.C. 102(e) as being anticipated by Pavelchek (US 2002/0195419 A1). Pavelchek exemplifies the synthesis of an organosilicon polymer comprising 9-anthracenemethyl methacrylate, 2-hydroxyethyl methacrylate and

Art Unit: 1752

3[tris(trimethyl)silyloxy]propyl methacrylate having a molecular weight of 22,000 (ex. 1, pg. 6, p. 0057). The said copolymer is admixed with POWDERLINK 1174 glycouril crosslinker, para-toluenesulfonic acid and ethyl lactate to form a composition (ex. 2, p. 0058-0060). It is the examiner position that 9-anthracenemethyl methacrylate meets the limitation of the instant claims wherein X is H, R1 is H, Z is CH3 and y is 2.

12. Claims 1-6, 13-17, 21 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Pavelchek et al. (US 6316165 B1). Pavelchek exemplifies the synthesis of a polymer comprising 9-anthracenemethyl methacrylate, 2-hydroxyethyl methacrylate and methyl methacrylate having a molecular weight of 8,355 (ex. 1, c. 15, l. 54-67; see also ex. 2-4). The said resin was admixed with POWDERLINK 1174 crosslinker, di-t-butyl diphenyl iodonium camphorsulfonate acid photoacid generator and p-toluenesulfonic acid monohydrate. The components are formulated in a solvent of ethyl lactate (ex. 5, c. 16, l. 51-c. 17, l. 9). The said composition is spin coated onto a silicon wafer and thermally cured. The cured layer is then overcoated with a positive acting photoresist, which is exposed and developed. It is the examiner position that 9-anthracenemethyl methacrylate meets the limitation of the instant claims wherein X is H, R1 is H, Z is CH3, and y is 2.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavelchek (US 6316165 B1) as applied to claims 1-6, 13-17, 21 and 23 above and in further view of Choi (US 6045970). Pavelchek as discussed above teaches all the limitation of the instant claims except it fails to teach a photoresist composition further comprising an organic base. It is the examiner's position that the incorporation of an organic base into a photoresist composition is well known and conventional in the art. This position is supported by the teachings of Choi (US 6045970 A), which discloses that the presence of an organic base prevents a decrease in critical size of the pattern after exposure caused by acid diffusing from an exposed portion of the photoresist to the unexposed portion. Choi teaches that suitable examples include triethylamine, triisobutylamine, diethanolamine and triethanolamine, preferably in the amount of 0.01-2 weight percent (c. 4, l. 22-31). It would have been obvious to one of ordinary skill in the art, light of the teachings of Choi to incorporate a conventional organic base such as triethylamine, triisobutylamine, diethanolamine and triethanolamine in the amount of 0.01-2 weight percent into the taught composition of Pavelchek in order to suppress the acid diffusion rate at which the acid generated from the photoacid generator diffuses into the overlying resist coating.

Allowable Subject Matter

15. Claims 7-12, 22 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 1752

16. The following is a statement of reasons for the indication of allowable subject matter: review of the prior art failed to teach and/or suggest copolymers as set forth in instant claims 7-12, 22 and 24 wherein the monomeric units of hydroxystyrene and maleic anhydride are required to be present. One of ordinary skill in the art would not have been motivated nor would it have been obvious to incorporate either a maleic anhydride or a hydroxystyrene monomer unit into the taught polymers of Pavelchek or Stolka as discussed above.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

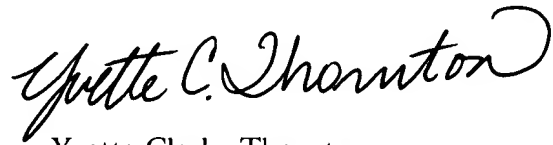
- Hong et al. (US 6486283 B2) pertaining to an organic antireflective coating polymer and composition thereof.
- Jung et al. (US 6368768 B1) pertaining to an organic antireflective coating material and its preparation.
- Kato et al. (US 5178982 A) pertaining to an electrophotographic light sensitive material.
- Irie et al. (JP 05-024951, machine translation) pertaining to a hydrophilic working method for surface molding (see p. 0031).

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 8-6:30.

19. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet C. Baxter can be reached on 703-308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Art Unit: 1752

20. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1495.

A handwritten signature in black ink, reading "Yvette C. Thornton". The signature is written in a cursive style with a large, looping "T" at the end.

Yvette Clarke Thornton
Junior Examiner
Art Unit 1752

yct
March 20, 2003